

That which is claimed is:

1. A photovoltaic device comprising:

- 5 (a) a substrate comprising silicon doped with a first dopant, the substrate having a front surface, a substantially smooth back surface, and at least one edge surface;
- (b) a first layer comprising a second dopant of a conductivity type opposite to the first dopant at the front surface and at the at least one edge
- 10 surface; and
- (c) a surface coating disposed over the front surface.

2. The photovoltaic device of Claim 1 wherein the surface coating is disposed over the at least one edge surface.

15 3. The photovoltaic device of Claim 2 wherein the surface coating is disposed over the periphery of the back surface.

4. The photovoltaic device of Claim 1 wherein the front surface is textured.

20 5. The photovoltaic device of Claim 1 wherein the back surface is free or substantially free of the second dopant.

6. The photovoltaic device of Claim 5 further comprising a back surface field.

25 7. The photovoltaic device of Claim 6 wherein the back surface field is formed by a second layer at at least a portion of the back surface, the second layer comprising aluminum alloyed with the substrate.

30 8. The photovoltaic device of Claim 1 wherein the surface coating comprises silicon nitride.

9. A photovoltaic module comprising the photovoltaic device of Claim 1.

10. A photovoltaic device comprising:

- (a) a substrate comprising doped silicon, the substrate having a back surface substantially free of a p-n junction and having a p-n junction proximal to a front surface and a p-n junction proximal to at least one edge surface; and
- (b) a surface coating disposed over the front surface.

11. The photovoltaic device of Claim 10 wherein the surface coating is disposed over the at least one edge surface.

12. The photovoltaic device of Claim 11 wherein the surface coating is disposed over the periphery of the back surface.

13. The photovoltaic device of Claim 10 wherein the front surface is textured.

14. The photovoltaic device of Claim 13 wherein the back surface is substantially smooth.

15. The photovoltaic device of Claim 14 further comprising a back surface field.

16. The photovoltaic device of Claim 10 wherein the surface coating comprises silicon nitride.

17. A process for making a photovoltaic device using a substrate comprising silicon doped with a first dopant, the process comprising the steps of:

- (a) forming a first layer of the substrate, the first layer comprising a second dopant of a conductivity type opposite the first dopant;
- (b) forming a surface coating disposed over the substrate such that a back surface of the substrate is free or substantially free of the surface coating; and
- (c) removing the second dopant from the back surface such that the back surface is free or substantially free of the second dopant.

18. The process according to Claim 17 further comprising the step of texturing the substrate.

19. The process according to Claim 18 further comprising the step of removing the texture from the back surface such that the back surface is substantially smooth.

20. The process according to Claim 19 further comprising the step of forming a back surface field.

21. The process according to Claim 17 wherein the surface coating comprises silicon nitride.

22. A process for making a photovoltaic device using a substrate comprising doped silicon, the process comprising the steps of:

- (a) forming a p-n junction proximal to the entire surface of the substrate;
- (b) forming a surface coating disposed over the substrate such that a back surface remains free or substantially free of the surface coating; and
- (c) removing the p-n junction from the back surface such that the back surface is free or substantially free of the p-n junction.

23. The process according to Claim 22 wherein the surface coating comprises silicon nitride.

24. The process according to Claim 22 further comprising the step of texturing the substrate.

25. The process according to Claim 24 further comprising the step of removing the texture from the back surface such that the back surface is substantially smooth.

26. The process according to Claim 25 further comprising the step of forming a back surface field.

27. A process for making a photovoltaic device using a substrate comprising silicon doped with a first dopant, the process comprising the steps of:

- (a) forming a first layer on at least a front surface of the substrate, the first layer comprising a second dopant of a conductivity type opposite the first dopant;
- (b) forming a surface coating disposed over the substrate such that a back surface of the substrate is free or substantially free of the surface coating; and
- (c) etching the back surface of the substrate.